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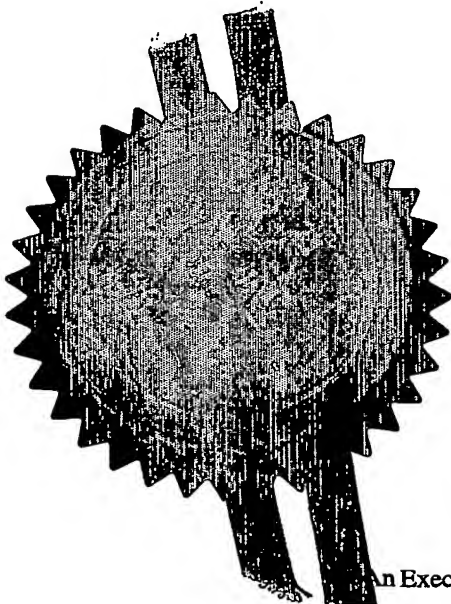
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**1. Your reference**

57905GB002

**2. Patent application number**

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0220585.4

**3. Full name, address and postcode of the or of each applicant (underline all surnames)**

3M Innovative Properties Company

3M Center / 220 12W 01

I-94 and McKnight Road

St. Paul

MIN 55144-1000, USA

USA / Delaware

Patents ADP number (if you know it)

If the applicant is a corporate body, give the country/state of its incorporation

766 4097004

**4. Title of the invention**

Flocked substrates for use as  
scouring materials

**5. Name of your agent (if you have one)**

Cecilia A. Hill

"Address for service" in the United Kingdom  
to which all correspondence should be sent  
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P.O. Box 1, Market Place

RG12 1JU Bracknell, Berkshire

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8459885001

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Country

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Claim(s)

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Signature

Cecilia A. Hill

Date

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Paula Roan  
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## FLOCKED SUBSTRATES FOR USE AS SCOURING MATERIALS

The present invention relates to substrates that are suitable for use as scouring materials in domestic cleaning.

5 Substrates that provide a scouring action are widely used for cleaning in the domestic environment, being most frequently employed for cleaning cooking utensils and for cleaning surfaces in kitchens and bathrooms. Scouring substrates that are already known for such uses include resin-bonded non-woven webs of the type described in US-A-2 958 593. Those webs may incorporate abrasive particles to enhance their abrasive action.

10

Also known for scouring cooking utensils are pads that are formed from a continuous tow of crimped or undulated filaments, as described in US-A-4 991 362. Those pads may also incorporate abrasive particles to enhance their abrasive action.

15 It has also been proposed, in GB-A-1 539 477 and WO 02/06009, to use flocked substrates for domestic cleaning and to enhance the abrasive action of the substrates by depositing abrasive particles (in the form of beads of resin) on the free ends of the flock fibres.

20 With the increasing use, in bathrooms and kitchens, of surfaces that can be damaged by aggressive abrasive materials, there is a growing demand from consumers for cleaning substrates that have a softer abrasive action but which, nevertheless, are able to remove material such as dirt, grease, burnt-on food etc. quickly and thoroughly. Consumers also require cleaning substrates that are themselves easy to clean (for example, simply by  
25 rinsing after use) and retain no undesirable residues (e.g. pieces of food) that could subsequently contaminate other surfaces on which they might be used. It is an object of the present invention to enable those requirements to be met.

The present invention is based on the surprising discovery that flocked substrates in  
30 which the flock fibres are short in comparison with those previously proposed for use in domestic scouring substrates can function efficiently as scouring materials without the

need to deposit any abrasive particles on the flock fibres. The absence of abrasive particles on the flock fibres reduces the likelihood that the substrate will damage a surface that is being cleaned.

- 5 The present invention accordingly provides, for use as a domestic scouring material, a flocked substrate wherein the flock comprises fibres that are arranged substantially perpendicular to the substrate and have a maximum length of 2.0 mm, the fibres being substantially free of abrasive particles.
- 10 Flocked substrates in which the flock fibres have a length of less than 2.0 mm and are free of abrasive particles have already been proposed for use as polishing pads in certain industrial processes (see WO 98/45112, FR-A-2 799 403 and EP-A-1 057 590 which describe the use of flocked substrates for polishing items such as optical glass and semiconductor substrates). In those industrial processes, the polishing pads are typically
- 15 used in combination with some form of polishing compound.

By way of example, embodiments of the invention will now be described with reference to the accompanying drawings, in which:

- Fig. 1 is a diagrammatic cross-section of a scouring substrate;
- 20 Fig. 2 is a diagrammatic cross-section of a hand-held cleaning pad; and
- Fig. 3 is a plan view of a patterned scouring substrate.

- The scouring substrate 1 shown in Fig. 1 is a flocked substrate in which the flock comprises fibres 3 arranged substantially perpendicular to the substrate material 5, and
- 25 secured to the substrate material by a layer of adhesive 7.

- Flocked substrates of the general type shown in Fig. 1, and processes for manufacturing them, are well known. In the conventional processes, a layer of adhesive is applied to the substrate material and, while the adhesive is still tacky, flock fibres are attracted to it
- 30 electrostatically so that they become embedded at one end in the adhesive and stand up

generally perpendicular to the substrate material. The substrate is then heated in an oven to dry and cure the adhesive layer.

- For the manufacture of the scouring substrate 1, any woven or non-woven flexible material suitable for domestic cleaning (i.e. able to withstand hot water and cleaning fluids) can be used for the substrate material 5. One suitable material is a woven polyester/cotton material comprising 65% polyester and 35% cotton, and having a basis weight of 105 g/m<sup>2</sup>.
- Any fibres known to be suitable for flocking and also suitable for domestic cleaning (i.e. able to withstand hot water and cleaning fluids) can be used for the flock 3. A particularly suitable material is polyamide, especially in the form of nylon 6 or nylon 6.6, but polypropylene or polyester fibres could also be used. The fibres preferably have a weight (defined in terms of their mass per unit length) in the range of from 15 to 80 dtex (more preferably in the range of from 22 to 50 dtex) and are cut to a length no greater than 2.0 mm. It has been found that a particularly effective scouring action is achieved using fibres having a length of 0.8 mm and a weight of 44 dtex, or a length of 0.4 mm and a weight of 22 dtex.
- The flock 3 may be applied evenly over the substrate material, in which case it is preferably applied in an amount of from 150 to 180 g/m<sup>2</sup>. Alternatively, the flock 3 may be applied so that it forms a pattern over the surface of the substrate material 5: the process by which that can be achieved is well-known and involves applying the adhesive 7 to the surface in the required pattern, usually by some form of printing process, with the result that the flock fibres will be adhered to the substrate only in the areas to which the adhesive has been applied. Fig. 3, for example, shows a pattern that is achieved by omitting the adhesive 7 from regularly-spaced rectangular patches 11 of the substrate material 5. In this case, the flock fibres 3 will adhere to the substrate material 5 everywhere except in those patches, where the substrate will remain exposed. The size of the patches 11 can be altered to change the area of the substrate material 5 that is not covered by the flock 3, and the shape of the patches 11 can also be changed.

The adhesive selected to bind the flock 3 to the substrate material 5 should also be suitable for domestic cleaning (in particular, it should be able to withstand hot water and cleaning fluids), and should not adversely affect the flexibility of the substrate material.

- 5 Suitable adhesives are acrylic adhesives and PVC (polyvinylchloride) resins, and are applied in an amount (for example, about 90 to 140 g/m<sup>2</sup>) that will yield a very thin layer on the substrate material.

- 10 It has been found that a flocked substrate constructed as described above with reference to Fig. 1 will provide an effective scouring action in the domestic environment, sufficient not only to clean kitchen and bathroom surfaces but also to remove burnt-on food from cooking utensils using normal liquid detergents, despite the absence of any abrasive particles on the flock fibres 3. The scouring action has been found to be comparable to, and in some cases better than, that of non-woven, non-scratch, domestic scouring
- 15 materials that are currently commercially available including some that contain plastic (or other soft) abrasive particles. On the other hand, the absence of abrasive particles from the flocked substrate substantially eliminates the risk of any damage being done to the surface that is being cleaned. The flocked substrate has been found not to trap residues of material removed from the surface that is being cleaned, so that any residues remaining
- 20 on the substrate after use are easily removed by simply rinsing the substrate in water. If desired, the substrate can be washed in hot water and detergent, and then re-used.

- In a preferred embodiment of the invention, a flocked substrate 1 as described above with reference to Fig. 1 is laminated to a layer of foam 9 as shown in Fig. 2, and the laminate
- 25 is then cut into pads of a suitable size for domestic cleaning. The foam 9 can be of any type known to be suitable for domestic cleaning, including cellulosic foams having a density in the range of from 75 to 125 Kg/m<sup>3</sup> and polyurethane foams having a density in the range of from 18 to 30 Kg/m<sup>3</sup>.

- 30 The foam can be of any suitable thickness but it has been found that thicknesses in the range of from 0.5 to 5.0 cm are particularly useful for domestic cleaning. When a thinner

layer of foam is used, the laminate can be cut into pads having a larger surface area (e.g. having dimensions of up to 20 cm by 20 cm). A thicker layer of foam may be more suitable for pads having a smaller surface area (e.g. dimensions of about 7 cm by 9 cm).



## CLAIMS

1. The use, as a domestic scouring material, of a flocked substrate wherein the flock comprises fibres that are arranged substantially perpendicular to the substrate and have a maximum length of 2.0 mm, the fibres being substantially free of abrasive particles.
2. The use of a flocked substrate as claimed in claim 1, in which the flock comprises fibres having a length in the range of from 0.4 to 0.8 mm.
3. The use of a flocked substrate as claimed in claim 1 or claim 2, in which the flock comprises fibres having a weight in the range 15 to 80 dtex.
4. The use of a flocked substrate as claimed in claim 3, in which the flock comprises fibres having a weight in the range of from 22 to 44 dtex.
5. The use of a flocked substrate as claimed in any one of the preceding claims, in which the flock comprises fibres having a length of 0.8 mm and a weight of 44 dtex.
6. The use of a flocked substrate as claimed in any one of claims 1 to 4, in which the flock comprises fibres having a length of 0.4 mm and a weight of 22 dtex.
7. The use of a flocked substrate as claimed in any one of the preceding claims, in which the flock comprises fibres of a polyamide material.
8. The use of a flocked substrate as claimed in any one of the preceding claims, in which the flock is secured to the substrate by an adhesive layer that does not substantially alter the flexibility of the substrate.
9. The use of a flocked substrate as claimed in claim 8, in which the flock is secured to the substrate by an acrylic adhesive or a PVC resin.

10. The use of a flocked substrate as claimed in any one of the preceding claims, in which the flock is non-uniformly disposed over the substrate.
11. The use of a flocked substrate as claimed in any one of the preceding claims, in which the substrate is a woven web material or a non-woven web material.
12. The use of a flocked substrate as claimed in any one of the preceding claims, in which the flocked substrate is laminated to a layer of foam.
13. The use of a flocked substrate as claimed in claim 12, in which the foam is a polyurethane or a cellulosic foam.
14. The use of a flocked substrate as claimed in claim 12 or claim 13, in which the foam has a thickness in the range of from 0.5 to 5.0 cm.
15. A hand-held cleaning pad comprising a flocked substrate laminated to a layer of foam, wherein the flock comprises fibres that are arranged substantially perpendicular to the substrate and have a maximum length of 2.0 mm, the fibres being substantially free of abrasive particles.
16. A hand-held cleaning pad as claimed in claim 15, in which the flock comprises fibres having a length in the range of from 0.4 to 0.8 mm.
17. A hand-held cleaning pad as claimed in claim 15 or claim 16, in which the flock comprises fibres having a weight in the range 15 to 80 dtex.
18. A hand-held cleaning pad as claimed in claim 17, in which the flock comprises fibres having a weight in the range of from 22 to 44 dtex.
19. A hand-held cleaning pad as claimed in any one of claims 15 to 18, in which the flock comprises fibres having a length of 0.8 mm and a weight of 44 dtex.

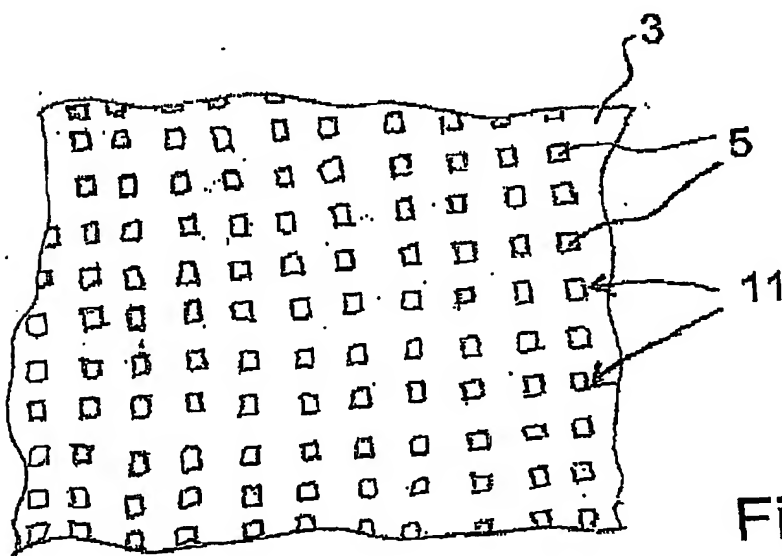
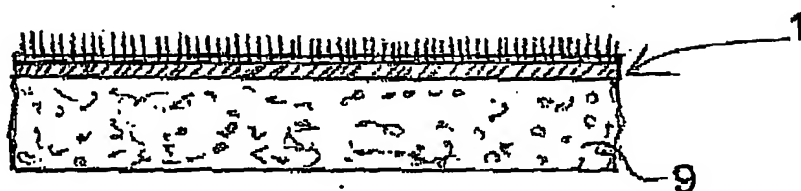
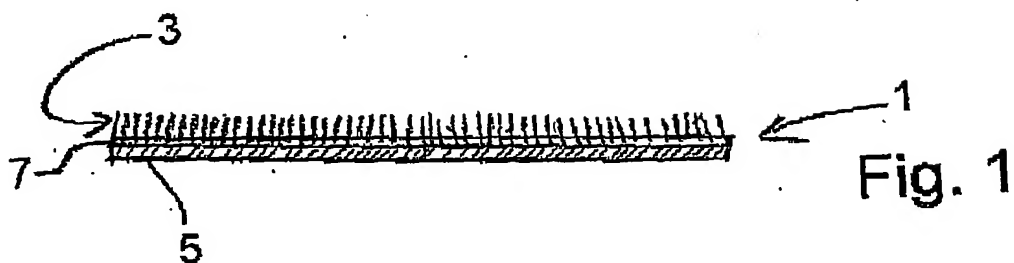
20. A hand-held cleaning pad as claimed in any one of claims 15 to 18, in which the flock comprises fibres having a length of 0.4 mm and a weight of 22 dtex.
21. A hand-held cleaning pad as claimed in any one of claims 15 to 20, in which the flock comprises fibres of a polyamide material.
22. A hand-held cleaning pad as claimed in any one of claims 15 to 21, in which the flock is secured to the substrate by an adhesive layer that does not substantially alter the flexibility of the substrate.
23. A hand-held cleaning pad as claimed in claim 22, in which the flock is secured to the substrate by an acrylic adhesive or a PVC resin.
24. A hand-held cleaning pad as claimed in any one of claims 15 to 23, in which the flock is non-uniformly disposed over the substrate.
25. A hand-held cleaning pad as claimed in any one of claims 15 to 24, in which the substrate is a woven web material or a non-woven web material.
26. A hand-held cleaning pad as claimed in any one of claims 15 to 25, in which the foam is a polyurethane or a cellulosic foam.
27. A hand-held cleaning pad as claimed in any one of claims 15 to 26, in which the foam has a thickness in the range of from 0.5 to 5.0 cm.

## ABSTRACT

A domestic scouring material comprises a flocked substrate (1) wherein the flock (3) comprises fibres that are arranged substantially perpendicular to the substrate and have a maximum length of 2.0 mm, the fibres being substantially free of abrasive particles. The flocked substrate can be laminated to a layer of foam (9) to provide a hand-held cleaning pad.

(Fig. 2)

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